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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/070,104	10/03/2002	Jun Akedo	KNI-162-A	9552

21828 7590 02/09/2006

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EXAMINER	
BLACKWELL RUDASI, GWENDOLYN A	
ART UNIT	**PAPER NUMBER**
1775	

DATE MAILED: 02/09/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/070,104	AKEDO ET AL.	
	Examiner	Art Unit	
	Gwendolyn Blackwell	1775	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 November 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-6,8-10 and 73-111* is/are pending in the application.

4a) Of the above claim(s) *81-97* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6,8-10,73-80 and 98-111* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *19 February 2002* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Newly submitted claims 81-97 are directed to inventions that are independent or distinct from the invention originally claimed for the following reasons:

The first set of new claims 81-94 are drawn to a method of making a composite structure require limitations that are not present in the elected composite structure. As such the originally elected composite structure can be made by a materially different method.

The second set of new claims 94-97 are drawn to a brittle material that do not contain all of the limitations of the originally elected composite structure. As such, the brittle material fine particles can be used for other than the composite structure as set for in the originally elected invention.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 91-97 are withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of

this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1-5, 10, 73-74, 78-80, and 98-111 are rejected under 35 U.S.C. 102(e) as being anticipated by United States Patent no. 6,280,802, Akedo et al.

Regarding claim 1

Applicant's independent claim 1 requires a composite structure made of at least one of a brittle ceramic and a brittle metalloid formed on a substrate surface, wherein the structure is polycrystalline and crystals forming the structure do not substantially exhibit crystal orientation, a boundary layer made of hyaline does not substantially exist on the boundary face between said crystals, and part of the formed structure is an anchor section biting into the substrate surface.

Akedo et al disclose a film formed of ultrafine particles of materials such as PZT, titanium dioxide, and Mn-Zn ferrite, which are set forth by Applicant as brittle materials (specification, pages 9-10, section 040), (column 11, lines 56-67), that have superior density and achieve a strong bond between the particles and the substrate with the crystal properties of the particles being able to be maintained, (column 2, lines 50-60), meeting the requirements of claim 1.

When the structure recited in the reference is substantially identical to that of the claims, the claimed properties or function are presumed inherent. *MPEP 2112.01*. Because the prior art exemplifies the applicant's claimed composite structure, the claimed physical property relating to the hyaline boundary layer is inherently present in the prior art. Absent an evidentiary showing to the contrary, the addition of the claimed physical property to the claim language fails to provide patentable distinction over the prior art over the prior art of record.

Regarding claim 73

Applicant's independent claim 73 requires a composite structure made of at least one of a brittle ceramic and a brittle metalloid formed on a substrate surface, wherein the structure is polycrystalline and crystals forming the structure do not substantially exhibit crystal orientation, a boundary layer made of hyaline does not substantially exist on the boundary face between said crystals, and part of the formed structure is an anchor section biting into the substrate surface and wherein the average crystallite size of the formed structure is 50 nm or less and the compactness thereof is 99% or more.

Akedo et al disclose a film formed of ultrafine particles of materials such as PZT, titanium dioxide, and Mn-Zn ferrite, which are set forth by Applicant as brittle materials (specification, pages 9-10, section 040), (column 11, lines 56-67), that has superior density and achieves a strong bond between the particles and the substrate with the crystal properties of the particles being able to be maintained, (column 2, lines 50-60). The particle (crystallite) size ranges from 10 nm - 5 μm, (column 2, line 50), with the film having a density (compactness) of not less than 95%, (column 13, claim 1), meeting the requirements of claim 73.

Because the prior art exemplifies the applicant's claimed composite structure, the claimed physical property relating to the hyaline boundary layer is inherently present in the prior art. *MPEP 2112.01.*

Regarding claims 79-80

Applicant's independent claims 79 and 80 require a composite structure made of at least one of a brittle ceramic and a brittle metalloid formed on a substrate surface, wherein the structure is polycrystalline and crystals forming the structure do not substantially exhibit crystal

orientation, a boundary layer made of hyaline does not substantially exist on the boundary face between said crystals, the displacement of four major peaks is 30% or less, and part of the formed structure is an anchor section biting into the substrate surface.

Akedo et al disclose a film formed of ultrafine particles of materials such as PZT, titanium dioxide, and Mn-Zn ferrite, which are set forth by Applicant as brittle materials (specification, pages 9-10, section 040), (column 11, lines 56-67), that has superior density and achieves a strong bond between the particles and the substrate with the crystal properties of the particles being able to be maintained, (column 2, lines 50-60). The particle (crystallite) size ranges from 10 nm - 5 μm, (column 2, line 50), with the film having a density (compactness) of not less than 95%, (column 13, claim 1), meeting the requirements of claims 78 and 80.

Because the prior art exemplifies the applicant's claimed composite structure, the claimed physical properties relating to the hyaline boundary layer and the displacement of four major peaks are inherently present in the prior art.

Regarding claims 2-5 and 74,

The film can be formed without the need for heat, (column 12, lines 59-65), meeting the requirements of claims 2 and 74. The particle (crystallite) size ranges from 10 nm - 5 μm, (column 2, line 50), with the film having a density (compactness) of not less than 95%, (column 13, claim 1), meeting the requirements of claims 3-5.

Regarding claims 10 and 78

Material such as metal and ceramics are used for the substrate, (column 12, lines 4-10), meeting the requirements of claims 10 and 78.

Regarding claims 98-111

Claims 98-111 are product by process claim wherein the patentability of the product does not depend on its method of production. "If the product in the product by process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." *See MPEP 2113.* As such, the process limitations within claims 98-111 do not provide patentable distinction absent a showing of criticality resulting in unexpected results between the claimed invention and the prior art of record.

4. Claims 1-4, 10, 73-74, 78-80, and 98-111 are rejected under 35 U.S.C. 102(e) as being anticipated by United States Patent no. 6,531,187, Akedo '187.

Regarding claim 1

Applicant's independent claim 1 is discussed above.

Akedo '187 discloses an ultrafine particle film wherein the particles are anchored to the substrate to form an underlying layer, (column 3, lines 47-52). PZT and titanium dioxide are examples of materials used for the particles, which are set forth by Applicant as brittle materials (specification, pages 9-10, section 040), (column 3, lines 38-43). The deposited film has a polycrystalline structure with crystallites ranging in size from 0.1-0.5 μm, (column 5, lines 47-58), meeting the requirements of claim 1.

Because the prior art exemplifies the applicant's claimed composite structure, the claimed physical property relating to the hyaline boundary layer is inherently present in the prior art. *MPEP 2112.01.*

Regarding claim 73

Applicant's independent claim 73 is discussed above.

Akedo '187 discloses an ultrafine particle film wherein the particles are anchored to the substrate to form an underlying layer, (column 3, lines 47-52). PZT and titanium dioxide are examples of materials used for the particles, which are set forth by Applicant as brittle materials (specification, pages 9-10, section 040), (column 3, lines 38-43). The deposited film has crystallite structures ranging in size from 0.1-0.5 μm, (column 5, lines 47-58), with the density (compactness) of the film being 97%, (column 6, lines 16-29), meeting the requirements of claim 73.

Because the prior art exemplifies the applicant's claimed composite structure, the claimed physical property relating to the hyaline boundary layer is inherently present in the prior art. *MPEP 2112.01.*

Regarding claims 79-80

Applicant's independent claims 79 and 80 require a composite structure made of at least one of a brittle ceramic and a brittle metalloid formed on a substrate surface, wherein the structure is polycrystalline and crystals forming the structure do not substantially exhibit crystal orientation, a boundary layer made of hyaline does not substantially exist on the boundary face between said crystals, the displacement of four major peaks is 30% or less, and part of the formed structure is an anchor section biting into the substrate surface.

Akedo '187 discloses an ultrafine particle film wherein the particles are anchored to the substrate to form an underlying layer, (column 3, lines 47-52). PZT and titanium dioxide are examples of materials used for the particles, which are set forth by Applicant as brittle materials

(specification, pages 9-10, section 040), (column 3, lines 38-43). The deposited film has crystallite structures ranging in size from 0.1-0.5 μm, (column 5, lines 47-58), with the density (compactness) of the film being 97%, (column 6, lines 16-29), meeting the requirements of claims 79 and 80.

Because the prior art exemplifies the applicant's claimed composite structure, the claimed physical properties relating to the hyaline boundary layer and the displacement of four major peaks are inherently present in the prior art.

Regarding claims 2-4 and 74

Heat is not needed for the formation of the film, (column 1, lines 52-57), meeting the requirements of claims 2 and 74. The deposited film has crystallite structures ranging in size from 0.1-0.5 μm, (column 5, lines 47-58), with the density (compactness) of the film being 97%, (column 6, lines 16-29), meeting the requirements of claims 3-4.

Regarding claims 10 and 78

The substrate can be made of materials such as silicon or stainless steel, (column 3, lines 42-43), meeting the requirements of claims 10 and 78.

Regarding claims 98-111

Claims 98-111 are product by process claim wherein the patentability of the product does not depend on its method of production. "If the product in the product by process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." *See MPEP 2113.* As such, the process limitations within claims 98-111 do not provide patentable distinction absent a showing of

criticality resulting in unexpected results between the claimed invention and the prior art of record.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> *(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.*

6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claims 6, 8-9 and 75-77 are rejected under 35 U.S.C. 103(a) as being unpatentable over United States Patent no. 6,280,802, Akedo et al as applied to claims 1 and 73 above.

Akedo et al disclose the limitations of claim 1 as set forth above. In addition, Akedo et al also disclose that if the particles to be deposited are oxide materials using air, oxygen, or other oxidizing agent, the oxygen deficiency in the oxides during deposition can be controlled, (column 5, lines 1-8). Akedo et al do not specifically disclose the aspect ratio of the crystals or that there is a non-stoichiometric deficiency.

Because Akedo et al disclose that the oxygen deficiency of the deposited film can be controlled, it would be within the skill of one in the art at the time of invention to modify the amount of oxygen in the in order to generate a film with improved characteristics and functionality, (columns 12-13, lines 59-5). It would further be within the skill of one in the art at the time of invention to modify the size of the particle and thus the aspect ratio in order to have a particle size which is not fused or decomposed thereby forming a thin film with superior density and adhesion, (column 2, lines 50-55).

Examiner's Comment

8. Claim 6 was and is still rejected under the 103-rejection set forth above. The number was inadvertently left off the 103-rejection header from the previous office action. However, it should be noted that the claim limitations with respect to the aspect ratio are rejected under the 103 rejection.

Response to Arguments

9. Applicant's arguments filed November 29, 2005 have been fully considered but they are not persuasive.

10. With regards to Applicant's contention that Akedo '187 and Akedo '802 do not produce a film having substantially no crystal orientation:

While Applicant provides data utilizing the process of Akedo '802 which demonstrates that some of the films would have crystal orientation, (see arguments pages 13-14), not all of the film presented have a crystal orientation. According to Applicant, the deviation of integrated intensity has to be less than 30% in order for the film to have substantially no crystal orientation.

In the data provided by Applicant, it *is* demonstrated that films made according to Akedo '802 do have substantially no crystal orientation as the deviation of integrated intensity is less than 30%. See page 14, example number 5, column 4, 25.3%; example number 6, columns 2 and 4, 12.0% and 11.4% respectively; example number 7, column 3, 9.4%, and example number 8, column 3, 11.6%.

Because the prior art according to Applicant's data demonstrates that a film having a substantially no crystal orientation is present.

11. With regards to Applicant's contention that Akedo '802 does not mention the size of the crystallites and Akedo '187 does not disclose a density of 99% or more:

The ultrafine particles have been taken to mean crystallites. Applicant has not objectively demonstrated that the feature will not be achieved. Arguments are not evidence. Akedo '202 specifically teaches that the density is greater than 95%, which would encompass 99% density or higher absent a showing to the contrary, (column 6, lines 27-28).

12. With regards to Applicant's contention that Akedo '187 is not prior art to the present application:

Applicant has not provided a translation of the JP '904 priority document. Even if Akedo '187 is later found not to be prior art, Akedo '802 is still relevant art rejecting the same claims rejected under Akedo '187.

13. With regards to Applicant's contention that Akedo '802 teaches away from having oxygen deficiency in the film:

While Akedo '802 discusses oxygen deficiency that occurs during deposition, Akedo '802 does not exclude all oxygen deficiency. There is a general discussion on how to control the oxygen deficiency not eradicate it completely.

14. For the reasons stated above the rejection under Akedo '187 and Akedo '802 stand.

Conclusion

15. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gwendolyn Blackwell whose telephone number is (571) 272-1533. The examiner can normally be reached on Monday - Thursday; 6:30 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jennifer McNeil can be reached on (571) 272-1540. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Gwendolyn Blackwell
Examiner
Art Unit 1775

JENNIFER MCNEIL
PRIMARY EXAMINER
2/6/6